

What Is Claimed Is:

1. A method of manufacturing a porous thick film as an oxygen partial pressure detecting part of a resistive oxygen sensor comprising taking a fine particle powder of an oxide containing cerium oxide as a raw material powder, preparing a paste containing the oxide, printing the paste onto a substrate by screen printing, calcining and sintering, the method comprising:

a heat treatment step of carrying out heat treatment to effect particle growth from the average particle diameter of the raw material powder to a particle diameter less than the average particle diameter of the ultimately obtained thick film;

a step of mixing the particle growth-effected powder with a solvent;

a step of dispersing agglomerated particles in the solvent;

a step of removing a precipitate;

a step of evaporating off the solvent; and

a step of mixing the resulting oxide with an organic binder to obtain the paste.

2. The method according to claim 1, wherein the average particle diameter of the porous thick film is not more than 200 nm.

3. The method according to claim 1, wherein the average particle diameter of the particle growth-effected powder obtained

through the heat treatment step is at least 45 nm.

4. The method according to claim 1, wherein the average particle diameter of the raw material powder before the heat treatment step is at least 10 nm but less than 45 nm.

5. The method according to claim 1, wherein the raw material powder is subjected to heat treatment at 880°C to 920°C in the heat treatment step.

6. The method according to claim 1, wherein the proportion by weight of the oxide in the paste is adjusted to 10 to 30 wt%.

7. The method according to claim 1, wherein the fine particle powder of an oxide containing cerium oxide is a fine particle powder of an oxide containing cerium oxide and zirconium oxide.

8. A cerium oxide-based porous thick film as an oxygen partial pressure detecting part of a resistive oxygen sensor, the porous thick film manufactured using the method according to any of claims 1 through 7, whereby the porous thick film has few cracks, has an average particle diameter of not more than 200 nm, and has an electrical conductivity of at least 10^{-3} S/m at 800°C.